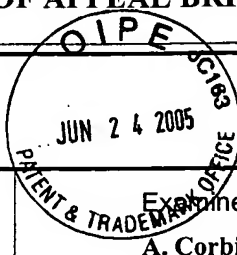


TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
112703-316

In Re Application Of: Song et al.

Application No.
10/743,501Filing Date
Dec. 22, 2003Examiner
A. CorbinCustomer No.
29156Group Art Unit
1761Confirmation No.
7778

Invention: METHOD FOR CONTINUOUS GUM BASE MANUFACTURING

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on April 14, 2005

The fee for filing this Appeal Brief is: \$500.00

- ☒ A check in the amount of the fee is enclosed.
- ☐ The Director has already been authorized to charge fees in this application to a Deposit Account.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 02-1818
- ☐ Payment by credit card. Form PTO-2038 is attached.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Signature

Dated: June 20, 2005

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June 20, 2005

(Date)

Signature of Person Mailing Correspondence

Heather Foster

Typed or Printed Name of Person Mailing Correspondence

CC:



AP
JW

**THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicants: Song et al.
Appl. No.: 10/743,501
Conf. No.: 7778
Filed: December 22, 2003
Title: METHOD FOR CONTINUOUS GUM BASE MANUFACTURING
Art Unit: 1761
Examiner: A. Corbin
Docket No.: 0112703-316

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellants submit this Appeal Brief in support of the Notice of Appeal filed on April 14, 2005 and received by the U.S. Patent and Trademark Office on April 18, 2005. This Appeal is taken from the Final Rejection dated January 14, 2005.

I. REAL PARTY IN INTEREST

The real party in interest for the above-identified patent application on appeal is Wm. Wrigley Jr. Company by virtue of an Assignment dated May 12, 1997 and recorded at the United States Patent and Trademark Office at reel 8498, frame 0155.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellant's legal representative and the Assignee of the above-identified patent application do not know of any prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision with respect to the above-identified Appeal.

III. STATUS OF CLAIMS

Claims 1-20 are pending in the above-identified patent application. Therefore, Claims 1-20 are being appealed in this Brief. A copy of the appealed claims is attached as Appendix A.

IV. STATUS OF AMENDMENTS

No amendments were made in this application after the final rejection. A copy of the Final Office Action is attached as Appendix B.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A summary of the invention by way of reference to the drawings and specification for each of the independent claims (claims 1, 13 and 19) and may be found in Appendix C to this Brief.

Although specification citations are given in accordance with C.F.R. 1.192(c), these reference numerals and citations are merely examples of where support may be found in the specification for the terms used in this section of the Brief. There is no intention to suggest in any way that the terms of the claims are limited to the examples in the specification. As demonstrated by the references numerals and citations below, the claims are fully supported by the specification as required by law. However, it is improper under the law to read limitations from the specification into the claims. Pointing out specification support for the claim terminology as is done here to comply with rule 1.192(c) does not in any way limit the scope of the claims to those examples from which they find support. Nor does this exercise provide a mechanism for circumventing the law precluding reading limitations into the claims from the specification. In short, the references numerals and specification citations are not to be construed as claim limitations or in any way used to limit the scope of the claims.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1-6, 9-17, 19 and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over European Patent Application No. 0,273,809 to Naumann (“*Naumann*”) in view U.S. Patent No. 4,379,169 to Reggio et al. (“*Reggio*”). A copy of *Naumann* is attached as Appendix D and a copy of *Reggio* is attached as Appendix E.
2. Claims 7, 8 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Naumann* in view *Reggio* and in further view of French Patent Application No. 2,635,441 to Boudy (“*Boudy*”). A copy of Boudy is attached as Appendix F.

VII. ARGUMENT

A. LEGAL STANDARDS

Obviousness under 35 U.S.C. § 103

Whether a claim is obvious is a question of law that is based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *In re Zurko*, 59 U.S.P.Q.2d 1693, 1696 (Fed. Cir. 2001).

The Patent Office has the initial burden of proving a *prima facie* case of obviousness. *In re Rijckaert*, 28 U.S.P.Q. 2d 1955, 1956 (Fed. Cir. 1993). In making this determination, the question is not whether the differences between the prior art and the claims themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 218 U.S.P.Q. 871 (Fed. Cir. 1983)(emphasis added). Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000).

The Federal Circuit has held, however, that “obvious to try” is not the standard under 35 U.S.C. §103. *Ex parte Goldgaber*, 41 U.S.P.Q. 2d 1172, 1177 (Fed. Cir. 1996). “An obvious-to-

try situation exists when a general disclosure may pique the scientist curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claim result would be obtained if certain directions were pursued.” *In re Eli Lilly and Co.*, 14 U.S.P.Q. 2d 1741, 1743 (Fed. Cir. 1990). Also, one cannot use “hindsight reconstruction to pick and choose among isolated disclosures in the prior art” to re-create the claimed invention. *In re Fine*, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988). Thus, the mere fact that the prior art can be combined to achieve Appellants’ claimed invention is not enough to demonstrate obviousness. *In re Laskowski*, 10 U.S.P.Q. 2d 1397 (Fed. Cir. 1989). Rather, the prior art, in its entirety, must provide the teaching to make the combination obvious. *In re Gorman*, 18 U.S.P.Q. 2d 1885 (Fed. Cir. 1991).

Of course, “a prior art reference is relevant for all that it teaches to those of ordinary skill in the art.” *In re Fritch*, 23 U.S.P.Q. 1780 (Fed. Cir. 1992). In this regard, “a prior art reference may be considered to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *Monarch Knitting Machinery Corp. v. Fukuhara Industrial & Trading Company Ltd.*, 45 U.S.P.Q. 2d 1977 (Fed. Cir. 1998). “If the examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.” *In re Oetiker*, 24 U.S.P.Q. 2d 1443, 1444 (Fed. Cir. 1992).

B. THE INDEPENDENT CLAIMS

Independent claims 1, 13 and 19 of the above-identified patent application each claim a process for making chewing gum. Specifically, claim 1 discloses a process for making chewing gum that uses a mixing apparatus to perform all the addition and compounding steps necessary to produce a gum base. All of the components or ingredients that are necessary to make a chewing gum base are then added to the mixing apparatus. Specifically, an elastomer that is not preblended or pretreated is added to the mixing apparatus. Once the gum base is mixed, other ingredients are added to the gum base to produce chewing gum. Thus, the process disclosed in claim 1 uses a single mixing apparatus to continuously mix all of the ingredients to produce a chewing gum base, where the elastomer is not preblended or pretreated.

Claim 13 discloses a process for producing chewing gum using a single extruder. The extruder performs all the necessary addition and compounding steps to produce the chewing gum base. All of the components necessary to make a chewing gum base are added into the extruder. Specifically, an elastomer that is not preblended or pretreated is added to the extruder. Once the chewing gum base is produced in the extruder, other ingredients are added to the completed gum base to make the chewing gum. Therefore, claim 13 defines a process for producing chewing gum base and chewing gum in a single apparatus, where the elastomer is not preblended or pretreated.

Claim 19 is directed to a process for making chewing gum in a continuous chewing gum production line. A single extruder is used to perform all the addition and compounding steps necessary to make the gum base. All of the components are mixed together in the extruder to produce the gum base including an elastomer, which is not preblended or pretreated. After the gum base is produced, the gum base is added to water soluble ingredients and mixed to produce chewing gum.

The independent claims are therefore directed to a process of producing a chewing gum base using a single mixing apparatus where the chewing gum base is produced using an elastomer that is not preblended or pretreated prior to being added to the single mixing apparatus.

C. THE REJECTIONS

In the Final Office Action, claims 1-20 were rejected under 35 U.S.C. §103 as stated in Section VI above in view of a number of references. Specifically, the Final Office Action states that the combination of *Naumann* and *Reggio* teaches the preblending or premixing of an elastomer and filler as well as the mixing of all of the other ingredients in a single mixing apparatus to form a gum base.

D. THE REJECTION OF CLAIMS 1-6, 9-17, 19 AND 20 SHOULD BE REVERSED BECAUSE THE PATENT OFFICE HAS FAILED TO ESTABLISH A PRIMA FACIE CASE OF OBVIOUSNESS

Appellants respectfully disagree with and traverse the rejection of claims 1-6, 9-17, 19 and 20 and submit that a person of ordinary skill in the art would not be motivated to combine *Naumann* and *Reggio* to achieve the claimed invention. Moreover, even if these references are combined, Appellants submit that the combination of *Naumann* and *Reggio* does not disclose, teach or suggest the claimed invention.

1. A Person of Ordinary Skill in the Art Would Not Be Motivated to Combine *Naumann* with *Reggio* to Achieve the Claimed Invention

Appellants submit that a person of ordinary skill in the art would not be motivated to combine *Naumann* with *Reggio* to achieve the claimed invention where there is no teaching or suggestion in either reference to make such a combination. Some of the differences between *Naumann* and *Reggio* are described in the following paragraphs.

Naumann is directed to a process for direct production of a gum base for chewing paste and chewing gum. The process includes blending or mixing an elastomer and a filler in mixing apparatus to form a non-adhesive pre-mix. (*Naumann*, page 3, lines 21 to page 4, line 3; Figure). The pre-mix is discharged from the mixing apparatus and divided into fragments. (*Naumann*, page 4, lines 4; Figure). Then metered amounts of the pre-mix fragments and at least one other starting material are introduced into a powder mixer and mixed for several minutes. (*Naumann*, page 4, 5-7; Figure). The mixture is then discharged from the mixer. Thus, *Naumann* teaches the formation of a gum base employing a multi-stage process where the elastomer and filler are *preblended* or *premixed* in one mixer and then transferred to a different mixer to be mixed with other ingredients to form the gum base.

Reggio is directed to a new gum base and a chewing gum containing the gum base. The process for making the gum base includes adding an elastomer and ester gums to a mixer and mixing these ingredients until a homogeneous mixture is achieved. (*Reggio*, Col. 5, lines 25-30). Subsequently, other ingredients such as waxes, flavors and the like are added to the mixer to form the gum base. (*Reggio*, Col. 5, lines 25-30; Col. 8, lines 16-25).

As stated above, *Naumann* does not disclose, teach or suggest that the pre-mix and other ingredients can be added to a single mixer to form the gum base. In fact, *Naumann* specifically

describes using at least two different mixers to form the gum base (i.e., mixing apparatuses A and B). Thus, *Naumann* teaches away from the process disclosed by *Reggio* because all of the components of the gum base produced by the process in *Naumann* are not mixed in a single mixer.

Moreover, *Naumann* discloses that the elastomer and filler are preblended in a mixing apparatus, discharged or removed from the mixing apparatus and divided into fragments. Subsequently, metered amounts of the pre-mix fragments produced by the preblending step are introduced in the subsequent mixing step to produce a gum base. (*Naumann*, page 4, lines 5-7 and 20-22). In contrast to *Reggio*, *Naumann* teaches that the preblended pre-mix is removed from the mixer before the other ingredients are added to the mixer. Thus, *Naumann* further teaches away from the process disclosed by *Reggio*.

Accordingly, a person of ordinary skill in the art would not be motivated to combine *Naumann* and *Reggio* to achieve the claimed invention where there is no teaching or suggestion in either reference to combine *Naumann* and *Reggio* and where *Naumann* teaches away from such a combination.

2. Even if *Naumann* and *Reggio* are Combined, the Combination Does Not Disclose, Teach or Suggest the Claimed Invention

The combination of *Naumann* and *Reggio* fails to disclose, teach or suggest the claimed invention because *Naumann* does not disclose or suggest using a single continuous mixing apparatus or a single extruder to perform all of the addition and compounding steps to produce a gum base. *Naumann* also does not disclose, teach or suggest a single mixing apparatus having at least two mixing zones. Furthermore, *Reggio* does not remedy the deficiencies of *Naumann*.

a. *Naumann* Fails to Disclose, Teach or Suggest the Claimed Invention

As described above, *Naumann* is directed to a process for the production of a gum base including the formation of a pre-mix including an elastomer and a filler in an industrial type mill or first mixing apparatus such as mixing apparatus A. (*Naumann*, page 3, lines 21-23; page 6, lines 7-11). The pre-mix is discharged from the mixing apparatus and divided into fragments. (*Naumann*, page 4, lines 2-4). Subsequently, metered amounts of the fragments of the pre-mix and a non-adhesive starting material are introduced and mixed in another different mixer such as

powder mixer B. (See also, *Naumann*, page 3, lines 21-23; page 6, lines 7-11). After the pre-mix and starting material are mixed in mixer B, the mixture is fed to an extruder such as extruder C (See, *Naumann*, page 4, lines 20-23; page 6, lines 7-11).

Naumann therefore teaches that the elastomer is *pre-mixed* or *preblended* with the filler prior to adding these ingredients with the other ingredients necessary to form the gum base. Thus, *Naumann* does not disclose, teach or suggest premixing or preblending the ingredients in a single continuous mixing apparatus or in a single extruder to form the gum base as in the claimed invention.

Additionally, *Naumann* does not disclose, teach or suggest a single mixing apparatus including at least two mixing zones as defined by claim 1. Although *Naumann* discloses two different mixers (i.e., Mixer A and Mixer B), the mixers are not contained within a single mixing apparatus or single extruder.

For at least these reasons, Appellants respectfully submit that *Naumann* does not disclose, teach, or suggest the claimed invention.

b. *Reggio Fails to Remedy the Deficiencies of Naumann*

In the Final Office Action, the Patent Office attempts to remedy the above deficiencies of *Naumann* using *Reggio*. Appellants disagree with the Patent Office and submit that *Reggio* does not remedy the deficiencies of *Naumann*.

Specifically, the Final Office Action states that:

Although *Naumann* discloses preblending of the elastomer and filler to form a premix . . . *Reggio et al* renders it obvious to avoid such premixing outside of a single mixing apparatus. In fact, the preblending or premixing which occurs in *Reggio et al* actually occurs in a single mixing apparatus to which all other ingredients are eventually added . . . Thus, while *Reggio et al* teaches preblending of on [sic] elastomer and ester gum . . . this is not a preblending which occurs prior to addition to a single mixing apparatus. (See the Final Office Action, pages 2-3).

Appellants submit that although *Reggio* teaches the mixing or blending of the gum base ingredients in a single mixing apparatus, *Reggio* does not disclose, teach or suggest that the mixing apparatus includes “at least two mixing zones” as defined by claim 1 of the above-identified patent application. Furthermore, Appellants submit that *Reggio* does not disclose,

teach or suggest employing a “single extruder” to perform all of the necessary addition and compounding steps to produce the gum base as defined by claims 13 and 19.

Reggio provides fourteen examples of bubble gum formulations representing different embodiments of the invention disclosed in *Reggio*. (*Reggio*, Col 4, lines 43-44). *Reggio* also describes the processes for preparing each of the formulations in the examples. Specifically, Examples 1, 2, 3, 4, 5, 6 and 7 describe the preparation process as follows:

The elastomer and ester gums were mixed in a sigma blade mixer until homogenous. Thereafter, the waxes were added with mixing followed by the remaining ingredients. Mixing was continued until a homogeneous mass was obtained. (Col. 4, lines 64-68).

This process mixes all of the ingredients in a single mixer and does not disclose, teach or suggest that the mixer includes “at least two different mixing zones” as defined by claim 1 of the present application. Moreover, *Reggio* does not disclose, teach or suggest a mixer or any mixing apparatus having multiple mixing zones as in the claimed invention. *Reggio* also does not disclose, teach or suggest adding the ingredients to a “single extruder” as defined by claims 13 and 19 of the present application.

Reggio describes a different process for preparing the formulations in Examples 8, 9, 10, 11, 12, 13 and 14. In these examples, *Reggio* generally describes the preparation process as follows:

The gum base was melted (temperature 250° F) and placed in a standard dough mixer kettle equipped with sigma blades and cooled to 180° F. [Certain ingredients] were added with mixing over a 5 minute period, thereafter . . . [other ingredients] . . . were added according to conventional chewing gum practice and mixed for 5 minutes. The gum was discharged from the kettle and was rolled or extruded and cut into sticks or cubes.

Again, this process teaches that all of the ingredients are added to the single mixer or kettle. However, *Reggio* does not disclose, teach or suggest mixing the ingredients in different mixing zones as defined by claim 1.

Furthermore as described above, *Reggio* does not disclose, teach or suggest adding the ingredients to a single extruder as defined by claims 13 and 19. Although the above process does teach that the gum is “rolled or extruded,” the extrusion step occurs after the gum is mixed and discharged from the mixer or kettle. Thus, a separate extruder is employed for the extrusion step.

For at least these reasons, *Reggio* does not remedy the deficiencies of *Naumann*. Appellants therefore respectfully submit that neither *Naumann*, *Reggio* or the combination of these references, disclose, teach or suggest the elements of claims 1-6, 9-17, 19 and 20. Accordingly, Appellants respectfully request that the rejection of these claims be reversed.

E. THE REJECTION OF CLAIMS 7, 8 AND 18 SHOULD BE REVERSED BECAUSE THE PATENT OFFICE FAILED TO ESTABLISH A PRIMA FACIE CASE OF OBVIOUSNESS

Claims 7, 8 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Naumann* in view of *Reggio* as applied to Claims 1-6, 9-17, 19 and 20 above, and further in view of *Boudy*. Appellants respectfully disagree with and traverse this rejection because there is no motivation to combine these references to achieve the claimed invention. Furthermore even if combined, the combination of *Naumann*, *Reggio* and *Boudy* does not disclose, teach or suggest the elements of the claimed invention.

A person of ordinary skill in the art would not be motivated to combine *Naumann*, *Reggio* and *Boudy* where there is no motivation or suggestion to make such a combination. As stated in Section D above, a person of ordinary skill in the art would not be motivated to combine *Naumann* with *Reggio* to achieve the claimed invention. Therefore for similar reasons, a person of ordinary skill in the art would not be motivated to combine *Naumann* and *Reggio* with *Boudy* to achieve the claimed invention.

Moreover, of the pending claims at issue, Claims 1, 13 and 19 are the independent claims as discussed above. Claims 7-8 depend from amended independent Claim 1 and Claim 18 depends from amended independent Claim 13. Therefore for at least the reasons provided above with respect to claims 1 and 13, the combination of *Naumann* and *Reggio* does not disclose, teach or suggest the elements of claims 7, 8 and 18.

Moreover, Appellants submit that *Boudy* does not remedy the deficiencies of *Naumann* and *Reggio*.

Boudy is directed to a process for preparing a gum base concentrate or gum base pre-mix and not for producing the gum base itself. (*Boudy* page 1, lines 3-4). This process produces the pre-mix by *grinding a high molecular elastomer into particles* in an impact disk mill 1. (*Boudy*, figure 1, page 4, lines 20-22). Thus, *Boudy* discloses that it *pretreats* the elastomer before it is added to the other necessary ingredients to produce the gum base concentrate or gum base pre-

mix. The ground elastomer is then mixed with plasticizers, then combined with mineral fillers. All these ingredients are then introduced into a twin screw extruder which forms the final pre-mix product. (*Boudy*, pages 4-5, lines 22-24, 1-2) Hence, *Boudy* also discloses that the elastomer is *preblended* prior to adding it with the remaining ingredients to form the gum base concentrate or gum base pre-mix. Thus contrary to the claimed invention, *Boudy* discloses a gum base concentrate or gum base pre-mix where the elastomer is preblended and pretreated prior to adding the remaining ingredients with the pre-mix.

Boudy also does not disclose, teach or suggest a single mixing apparatus having at least two mixing zones for preparing a gum base. Instead, *Boudy* discloses preparing the gum base using different devices as shown in Fig. 1.

Furthermore, *Boudy* discloses that certain of the ingredients of a gum base are mixed and then introduced into a separate twin-screw extruder. (*Boudy*, page 3, lines 12-14; Figure 1). *Boudy*, however, does not disclose, teach or suggest that the ingredients are added to a single extruder for making the gum base as in the claimed invention.

Accordingly, based on the teachings of *Naumann*, *Reggio*, and *Boudy*, Appellants respectfully submit that this combination does not disclose, teach or suggest that the elements of claims 7, 8 and 18. Therefore for at least these reasons, Appellants respectfully request that the rejection of claims 7, 8 and 18 be reversed.

VIII. CONCLUSION

Appellants respectfully submit that claims 1-20 are not anticipated and non-obvious in view of the cited references under 35 U.S.C. §103. Accordingly, Appellants respectfully submit that the rejection of pending claims 1-20 is erroneous in law and fact and should be reversed by this Board.

Respectfully submitted,

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Dated: June 20, 2005



APPENDIX A

PENDING CLAIMS ON APPEAL OF U.S. PATENT APPLICATION SERIAL NO. 10/743,501

1. A process for making chewing gum comprising the steps of:
using a single continuous mixing apparatus to perform all of the addition and compounding steps necessary to produce gum base;
adding to the single continuous mixing apparatus all of a group of components necessary to make a chewing gum base including an elastomer and a plasticizer, wherein the elastomer is added to the single continuous mixing apparatus separate and apart from the plasticizer and the elastomer is not preblended or pretreated prior to the addition to the single continuous mixing apparatus;
providing at least two mixing zones in the mixing apparatus;
producing gum base from the mixing apparatus; and
mixing the gum base with other ingredients to produce chewing gum.
2. The continuous process of Claim 1 wherein the at least two mixing zones include a distributive mixing zone and a dispersive mixing zone.
3. The continuous process of Claim 1 wherein an elastomer and a filler are fed into the mixing apparatus before other components of the chewing gum base.
4. The continuous process of Claim 1 wherein the mixing apparatus includes a first dispersive mixing zone.
5. The continuous process of Claim 1 wherein the mixing apparatus is a high efficiency mixer.
6. The continuous process of Claim 1 wherein the mixing apparatus includes a blade-and-pin mixer.

7. The continuous process of Claim 1 wherein the process is carried out in a counter-rotating, intermeshing twin screw extruder.

8. The continuous process of Claim 1 wherein the mixing apparatus includes a plurality of toothed elements counter-rotating with respect to adjacent toothed elements.

9. The continuous process of Claim 1 wherein the gum base components are added to the mixing apparatus at least two spatially separated points.

10. The continuous process of Claim 1 wherein a portion of the chewing gum base components are subjected to a highly dispersive mixing operation prior to a highly distributive mixing operation.

11. The continuous process of Claim 1 wherein the adding and mixing steps are controlled to operate at a steady state.

12. The continuous process of Claim 1 wherein at least some of the components are added to the mixing apparatus at different locations in an order that approximately corresponds to a decreasing order of viscosity.

13. A process for producing chewing gum comprising the steps of:
using a single extruder to perform all necessary addition and compounding steps to produce gum base;

adding to the single extruder all of a group of components necessary to make a gum base including an elastomer and a plasticizer, wherein the elastomer is added to the extruder separate and apart from the plasticizer and the elastomer is not preblended or pretreated prior to the addition to the single continuous mixing apparatus;

mixing the components in the single extruder;

producing the gum base using the single extruder; and

adding the gum base to other ingredients to make chewing gum.

14. The continuous process of Claim 13 wherein an elastomer and a filler are fed into the extruder before other components of the gum base.

15. The continuous process of Claim 13 wherein the extruder includes a first dispersive mixing zone.

16. The continuous process of Claim 13 wherein the extruder is a high efficiency mixer.

17. The continuous process of Claim 13 wherein the extruder includes a blade-and-pin mixer.

18. The continuous process of Claim 13 wherein the process is carried out in a counter-rotating, intermeshing twin screw extruder.

19. A process for making chewing gum in a continuous chewing gum production line comprising the steps of:

using a single extruder to perform all of the addition and compounding steps necessary to produce a gum base;

adding to the single extruder components necessary to make a gum base the components including an elastomer and a plasticizer, wherein the elastomer is added to the single continuous mixing apparatus separate and apart from the plasticizer and the elastomer is not preblended or pretreated prior to the addition to the single continuous mixing apparatus;

producing gum base from the single extruder;

adding the gum base to water-soluble ingredients; and

mixing the chewing gum base and water-soluble ingredients to produce chewing gum.

20. The continuous process of Claim 19 wherein an elastomer and a filler are fed into the extruder before other components of the gum base.

APPENDIX B

Final Office Action Mailed on January 14, 2005



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|--|-------------|----------------------|------------------------------|------------------|
| 10/743,501 | 12/22/2003 | Joo H. Song | 112703-316 | 7778 |
| 29156 | 7590 | 01/14/2005 | | |
| BELL, BOYD & LLOYD LLC P. O. BOX 1135 CHICAGO, IL 60690-1135 | | | | |
| | | | EXAMINER CORBIN, ARTHUR L | |
| | | | ART UNIT 1761 | PAPER NUMBER |

DATE MAILED: 01/14/2005

DUE: 4-14-05

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/743,501

Applicant(s)

SONG ET AL.

Examiner

Arthur L Corbin

Art Unit

1761

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Art Unit: 1761

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6, 9-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naumann (EP 0,273,809, pages 5-9, 16 and 17 of translation) in view of Reggio et al (4,379,169, col. 4, lines 64-68).

Applicant is referred to the reasoning set forth in paragraph no. 2, paper No. 081004.

3. Claims 7, 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naumann in view of Reggio et al as applied to claims 1-6, 9-17, 19 and 20 above, and further in view of Boudy.

Applicant is referred to the reasoning set forth in paragraph no. 3, paper No. 081004.

4. Applicant's arguments filed November 18, 2004 have been fully considered but they are not persuasive. Although Naumann discloses preblending of the elastomer and filler to form a premix, as applicant argues, Reggio et al renders it obvious to avoid such premixing outside of a single mixing apparatus. In fact, the preblending or premixing which occurs in Reggio et al actually occurs in a single mixing apparatus to which all other ingredients are eventually added, i.e. a sigma blade mixer. Thus, while Reggio et

Art Unit: 1761

al teaches preblending of on elastomer and ester gum, as applicant recognizes, this is not a preblending which occurs prior to addition to a single mixing apparatus.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arthur L. Corbin whose telephone number is (571) 272-1399. The examiner can normally be reached on Monday - Friday from 10:30 am to 8:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571) 272-1398. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1761

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Corbin/af
January 13, 2005



ARTHUR L. CORBIN
PRIMARY EXAMINER

1-13-06

APPENDIX C

| Claim 1 | Drawings | Specification |
|--|----------|---------------------|
| A process for making chewing gum comprising the steps of: | Fig. 1 | Page 9, lines 25-32 |
| using a single continuous mixing apparatus to perform all of the addition and compounding steps necessary to produce gum base; | Fig. 1 | Page 4, lines 16-21 |
| adding to the single continuous mixing apparatus all of a group of components necessary to make a chewing gum base including an elastomer and a plasticizer, wherein the elastomer is added to the single continuous mixing apparatus separate and apart from the plasticizer and the elastomer is not preblended or pretreated prior to the addition to the single continuous mixing apparatus; | | Page 4, lines 16-21 |
| providing at least two mixing zones in the mixing apparatus; | | Page 5, lines 19-28 |
| producing gum base from the mixing apparatus; and | | Page 4, lines 16-25 |
| mixing the gum base with other ingredients to produce chewing gum. | | Page 5, lines 26-28 |

| Claim 13 | Drawings | Specification |
|---|-----------------|--|
| A process for producing chewing gum comprising the steps of: | Fig. 1 | Page 9, lines 25-32 |
| using a single extruder to perform all necessary addition and compounding steps to produce gum base; | Fig. 1 | Page 4, lines 16-21; Page 13, lines 14-15 |
| adding to the single extruder all of a group of components necessary to make a gum base including an elastomer and a plasticizer, wherein the elastomer is added to the extruder separate and apart from the plasticizer and the elastomer is not preblended or pretreated prior to the addition to the single continuous mixing apparatus; | | Page 4, lines 16-21 Page 5, lines 1-4 |
| mixing the components in the single extruder; | | Page 5, lines 12-18 |
| producing the gum base using the single extruder; and | | Page 5, lines 25-26 |
| adding the gum base to other ingredients to make chewing gum. | | Page 5, lines 26-28 |

| Claim 19 | Drawings | Specification |
|--|-----------------|--|
| A process for making chewing gum in a continuous chewing gum production line comprising the steps of: | Fig. 1 | Page 9, lines 25-32 |
| using a single extruder to perform all of the addition and compounding steps necessary to produce a gum base; | Fig. 1 | Page 4, lines 16-21; Page 5, lines 1-4; Page 13, lines 14-15 |
| adding to the single extruder components necessary to make a gum base the components including an elastomer and a plasticizer, wherein the elastomer is added to the single continuous mixing apparatus separate and apart from the plasticizer and the elastomer is not preblended or pretreated prior to the addition to the single continuous mixing apparatus; | | Page 4, lines 16-21 |
| producing gum base from the single extruder; | | Page 5, lines 25-26 |
| adding the gum base to water-soluble ingredients; and | | Page 9, line 25 to Page 10, line 27 |
| mixing the chewing gum base and water-soluble ingredients to produce chewing gum. | | Page 9, line 25 to Page 10, line 27 |

APPENDIX D

European Patent Application No. 0,273,809 (“Naumann”)



- [19] European Patent Office
- [12] Patent Application
- [11] Publication No.: 0 273 809 A2
- [21] Application No.: 87402735.2
- [22] Application Date: 12/2/87
- [30] Priority: 12/4/86 FR 8616988
- [43] Application Publication Date: 7/6/88, Bulletin 88/27
- [51] Int. Cl.⁴: A 23 G 3/30
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- [54] Title: PROCESS FOR DIRECT PRODUCTION OF GUM BASE FOR CHEWING PASTE AND CHEWING GUM

ABSTRACT

To produce a gum base, at least one elastomer (a) and at least one mineral filler (b) are placed in a mixer (A); the filler is heated at 80-100°C and mixed for 15-75 minutes; the premix (c) is discharged and divided into fragments (d), which are introduced into a powder mixer (B) with at least one other raw material (e); after mixing for several minutes, mixture (f) is extracted. To produce a chewing paste of the chewing gum type, introduce into an extruder (C) having several segments, each of which can be maintained at a desired temperature, metered amounts of fragments (d) of the premix (c), at least one plasticizer (g,h) and at least one flavoring agent (j,k), the passage through the extruder being accomplished within several minutes, and the product obtained being then discharged from the extruder, cooled and shaped.

Description

PROCESS FOR DIRECT PRODUCTION OF GUM BASE FOR CHEWING PASTE AND CHEWING GUM

The present invention relates to chewing pastes (chewing gums) and the gum bases for producing such pastes; it relates to a new process for their preparation and an improved composition of these products.

In the prior art, a chewing paste or chewing gum included a minor proportion of a gum base with additives and a major proportion of substances that gave it a sweet taste, together with aromas; according to this technique, the chewing paste includes no more than about 30 weight percent (generally about 20 weight percent) gum base and additives and no less than about 70 weight percent (generally about 80 weight percent) sweet substances (sugar) or substitutes such as polyalcohols, saccharine or aspartame, and at least one percent aromatic substances to give it a fragrance (mint, fruits and/or spices).

The different ingredients are mixed hot to constitute the gum base, which is purified and then mixed with the sugar products (or their substitutes) and the aromatic substances, and the chewing paste of the chewing gum type, which is packaged in the form of tablets, pellets, etc.

In the state of the art, it is not possible to automatically meter, at ambient temperature, the different materials placed in the mixing apparatus and extruders used for producing chewing gum; one might contemplate performing automatic metering with heating of the different substances to a sufficient temperature (on the order of 150°C or more), but such a temperature elevation would cause degradation of the substances and off flavors as well as

substances producing an interfering flavor in the finished chewing gum.

For these reasons, no continuous gum base or chewing gum production has been conducted heretofore.

Furthermore, the products obtained with the conventional compositions and processes include an elevated percentage of extractable materials, including a high proportion of substances with a sweet taste (certain of these substances being adverse to dental health and having a high caloric value), the percentage of insoluble gum base being relatively low, as indicated above (on the order of 20 percent).

The object of the invention is to remedy the above disadvantages, making it possible to prepare, continuously with automatic metering of the components and at a moderate temperature, ie, without deleterious alteration of the raw materials, a chewing gum containing only a low proportion of extractable materials, these extractable materials also being relatively neutral with regard to their effect on the teeth.

The first object of the invention, with regard to the process, is:

a) a process for continuous production, with metering of the components, a composite nonadhesive gum base, particularly for a chewing paste of the chewing gum type, characterized by the following successive operations:

(i) at least one elastomer and at least one mineral filler are introduced into a mixing apparatus of the industrial mill type including heating means; the mixing apparatus is heated to raise its contents to a temperature ranging from about 80°C to about 100°C, and the mixer contents held at that temperature are mixed for a time

period ranging from about 35 minutes to about 75 minutes;

(ii) the contents of the mixing apparatus are then discharged and then consist of a nonadhesive premix;

(iii) said premix is divided into fragments;

(iv) metered amounts of fragments of said premix and at least one other nonadhesive starting material of the gum base are introduced into a powder mixer, and the contents are mixed for several minutes;

(v) the mixture thus obtained is then evacuated from the mixer;

b) A process for producing a chewing paste of the chewing gum type, characterized by following successive operations:

(i) at least one elastomer and at least one mineral filler is introduced into a mixing apparatus of the industrial mill type including heating means; the mixing apparatus is heated to raise its contents to a temperature ranging from about 80°C to about 100°C, and the mixer contents, held at that temperature, are mixed for a time period ranging from about 35 minutes to about 75 minutes;

(ii) the contents of the mixing apparatus are subsequently discharged and then consist of a nonadhesive premix;

(iii) the fragments of said premix are divided;

(iv) the following are introduced in metered amounts into an extruder with several segments and with means of maintaining each segment at a desired temperature:

- fragments of said premix and at least one other nonadhesive raw material of the gum base,

- at least one plasticizer, and

- at least one flavoring, notably with a sweet taste, the passage of the fragments of premix and of the other raw material(s) of the gum base in the extruder being accomplished in several minutes, notably 1-5 minutes; and

(v) the product obtained is then removed from the extruder, cooled and shaped.

Preferably the fragment of said premix and of at least one other gum base raw material are preferably mixed in a powder mixer for several minutes prior to being fed into the extruder, the mixture obtained in said mixer being fed to the first segment of the extruder, while the plasticizer(s) is/are introduced into the second segment of the extruder, and the flavoring(s) is/are fed to the third segment of the extruder.

With regard to the chewing paste of the chewing gum type, including a gum base obtained by the above-specified process, the invention also consists of making this paste contain no less than 97% gum base with at least one plasticizer, at least one filler and water, and no more than 3% sweetener and flavorings.

Preferably the gum base contains about 3-30% water and about 2-5% lecithin and/or glycerin as an emulsifier.

Advantageously, the flavoring substances used are nonsugar products such as saccharine or aspartame.

In any case, the invention can be readily understood with the aid of the remaining description in the following and the single attached figure (said remaining description and figure being given, of course, primarily by way of illustration).

The single figure is a highly schematic diagram of a device illustrating the embodiment of the process of the invention for obtaining a chewing paste of the chewing gum type, also in accordance with the invention.

According to the invention, it is proposed to perform a process for preparing and composing chewing pastes of the chewing gum type and gum bases for said pastes in the following manner or a similar manner.

The device in the single figure includes essentially three units, ie, a mixing apparatus A of the industrial mill type, a powder mixer B and an extruder C with three segments C_1 , C_2 and C_3 , the final operations (D_1 cooling, D_2 shaping and cutting, and D_3 packaging) being included in rectangle D.

The elastomer or elastomers *a* and the mineral fillers *b* are fed to mixer A of the industrial mill type, eg, of the mill type including two mixing blades 1 in Z form.

In particular, the elastomers of the natural type (chicle, jelutong or sorva, which are dried lattices) or synthetic type (isopropylene copolymers called butyl rubber, polyisobutylenes, polyisobutene) and synthetic resins and/or waxes can be used.

With regard to the mineral fillers, they generally consist of talc and/or calcium carbonate, the latter contributing to the neutralization of acid traces that may form on the teeth, thus reducing dental caries.

Mixing apparatus A is provided with a double shell (not illustrated) by means of which its contents can be heated to a temperature on the order of 80-100°C.

When the elastomer or elastomers and the filler or fillers are inside

apparatus A and are maintained at the aforementioned temperature, the 2 blades mix these products for a time period ranging from about 35 to 75 min depending on the composition of the mixture.

By way of example, for a mixture consisting of:

butyl rubber 18%

polyisobutylene 19%

talc 63%

and for a temperature of 85°C of the mixture, mixing is performed for 40 min.

The mineral fillers (such as talc and/or carbonate) can be fed in several stages depending on the type of elastomers used, in order to reduce the mechanical heating of the mass contained in the mixing apparatus A; such heating is deleterious to the quality of the finished product.

When the elastomer or elastomers introduced into a are adhesive, the premixing in mixing apparatus A is nonadhesive and thus easy to manage. Apparatus A may therefore be easily discharged, even by dumping.

Nonetheless, an endless screw 2 is advantageously provided at the base of mixing apparatus A to facilitate extraction of premix c from mixing apparatus A.

At the outlet of endless screw 2, one may provide an impeller breaker E or a similar device which shears premix c to produce fragments such as chips or flakes, d, of premix, ie, of the mixture of elastomer(s) and mineral filler(s).

These fragments d are cooled to about 20°C in an apparatus (not represented), then metered into an apparatus (also not represented).

The cooled, metered fragments d' are introduced into the powder mixer B,

which includes, for example, a band 3 that is turned by a shaft 4 inside the mixer.

At least one other raw material *e* of the gum base, such as waxes, resins, polyvinyl acetate and emulsifiers, is also introduced into the mixer.

The mixing of the components *d'* and *e* in mixer B lasts for about 10 min at ambient temperature.

Obtained at the outlet of powder mixer B is a premix *f*, which is fed to a metering apparatus F.

After metering in this apparatus, the unplasticized gum base is introduced into the first segment *C₁* of an extruder of the single- or double-screw type.

In the first segment or container *C₁* of extruder C, a temperature is maintained on the order of 60-75°C to raise this unplasticized gum base to that temperature.

The output from segment *C₁*, the premix heated to a temperature of 60-75°C, plus a liquid plasticizer are fed to the second segment or container *C₂* of the extruder, which is maintained at a temperature on the order 50°C.

In particular, one may feed, via a pump *C₄*, a well-defined flow of at least one plasticizer *g* consisting of lecithin and/or glycerin, and via pump *C₅*, an equally well-defined flow of water *h*; particularly in the event one wishes to produce a chewable gum base, water is fed in a concentration ranging from 1 to 30 weight percent relative to the gum base.

The output of segment *C₂* is fed to the third segment or container *C₃* of extruder C, that segment being maintained at a temperature of 50-60°C and receiving additionally the most high temperature-sensitive substances such as

the sweeteners, aromas, vitamins or any other active principle.

Illustrated in the figure is a pump C_6 for adding a metered flow of such substances j in the liquid state and an assembly C_7 including a hopper and an endless screw for introducing a flow, also metered, of such substances k in the powder state.

At the outlet of extruder C , ie, at the outlet of the third segment of the container C_3 , the chewing paste l is obtained; it is cooled at D_1 , shaped and cut at D_2 and packaged, for example, wrapped at D_3 , all in a conventional manner. Finally, the finished product, ie, the chewing gum m , is obtained at the outlet of assembly D (consisting of cooling units D_1 , forming and cutting units D_2 and packaging unit D_3).

As a variant, one could obviate the powder mixer B by feeding not the mixture f as illustrated but, separately, the fragments or flakes d' of premix and the other raw material(s) e of the gum base into the first segment C_1 of extruder C .

With regard to the chewing gum composition, the invention is characterized essentially by the fact that it proposes a chewing gum consisting:

- of at least 97 weight percent gum base including - in addition to the natural and/or synthetic elastomers with optional additives such as microcrystalline waxes, hydrogenated oils, glycerol monostearate, synthetic resins, polyvinyl acetates and the fillers (notably talc and/or calcium carbonate) - lecithin and/or glycerin (notably lecithin in an amount of 2-5 percent) and water (notably in the amount of 5-30 percent); and

- of no more than 3 weight percent sweetener (notably artificial

sweetener having a sweetening power in excess of that of sugar) and natural or artificial fragrance, such a composition being characterized by the compositions of the prior art.

Indeed, it is known that, currently, a chewing gum comprises less than 30 weight percent, generally 20 weight percent of gum base consisting of elastomers (natural and/or synthetic gum) and plasticizing substances (such as waxes, paraffins, vegetable oils), additives such as glycerol monostearate, plasticizer substances and adhesives for conferring the desired texture to the chewing gum, and to this gum base are currently added massive amounts of at least 70 weight percent, generally 80 weight percent sugar (conventional sugar-containing chewing gum) or polyalcohols and synthetic sweeteners (such as saccharine or aspartame) for the more-recent sugarless chewing gums, the latter having the advantage of being less harmful to the teeth in view of the absence of sugar.

In all cases, these prior chewing gums with or without sugar comprise a minor proportion of gum base (less than 30 percent) and a major proportion of sugar or polyalcohols and artificial substances with a high sweetening power.

As a result, a relatively high proportion of the weight of the prior art chewing gum is extractable by the consumer during chewing.

Thus, we see the essential modification proposed by the invention, ie, the production of a chewing gum with a very high proportion (at least 97%) of gum base by including lecithin and/or glycerin and water, and a very low proportion (at the most 3 percent) sweeteners and possibly flavorings.

More precisely, a gum base for a chewing gum in accordance with the invention consists of a mixture of the following substances:

Table I

| | |
|---|--------------------------------|
| Natural and/or synthetic elastomers (for example, polyisobutylene and/or butyl) | about 3-11% |
| Microcrystalline waxes and/or hydrogenated oils | 5-20% |
| Glycerol monostearate | 0.5-15% |
| Semisynthetic resins and/or polyvinyl acetate | 10-30% |
| Fillers (talc and/or calcium carbonate) | 20-50% |
| Lecithin and/or glycerin | 2-5% |
| Antioxidant (BHA for example) | 0.05-0.1% (on the order of) |
| Sodium benzoate | 0.1% (on the order of) |
| Water | 5-30% |

The presence of sodium benzoate inhibits the development of fungi at water contents in excess of 6%.

To produce the chewing gum, no more than 3 weight percent of synthetic sweeteners with high sweetening power and, optionally, aromas (mint, fruit and/or spice extracts) is added to no less than 97 weight percent of this gum base.

By way of example, a particular chewing gum according to the more general indications above may have the following composition:

Table II

| | | | | |
|------------------------|-------|----------|---------------------------------|--------|
| Polyisobutylene | 2.55% | } 5.51% | Talc | 40.51% |
| Butyl | 2.96% | | BHA | 0.05% |
| Microcrystalline waxes | 7.10% | } 15.45% | Lecithin | 4.0% |
| Soybean oil | 8.35% | | Water | 10.0% |
| Glycerol monostearate | 1.0% | | | |
| Semisynthetic resins | 13.0% | } 20.40% | Aromas | 2.68% |
| Polyvinyl acetate | 7.40% | | Saccharin | 0.3% |
| Sodium benzoate | 0.1% | | (Total aroma + saccharin 2.98%) | |

A comparative study by a group of experts of the texture of chewing gum samples prepared according to the preceding example shows that this chewing paste has characteristics at least equal and in most cases superior to those of the traditional chewing gums, particularly with regard to the initial indentation hardness and the hydration time. The evaluations of the experts are shown in Table III below.

On the other hand, we also verified, as shown in Tables IV and V, that the quantity of substances extracted was very low (less than 2% of the total weight), these substances also being nonmetabolizable (talc, carbonate, aromatic products, sweetener, coloring agent), and the pH of the saliva during chewing had a tendency to maintain a level above 7, which is very favorable for preventing dental plaque formation.

The extracted talc was determined by weight analysis after calcination in an incinerator. The aromas and BHA present in the saliva were quantitatively

Table III

(Texture)

| | Initial indentation hardness | Cohesion | Final elasticity | Final adhesion | Hydration time |
|---------------------|------------------------------------|----------|---------------------|-------------------|-------------------|
| Sugar-containing CG | 6/10 | 8/10 | 3/10 | 3/10 | 30 sec |
| Sugarless CG | 5/10 | 7/10 | 3/10 | 1/10 | 25 sec |
| Invention | 1/10 | 10/10 | 3/10 | 2/10 | 5 sec |

CG: prior art chewing gum

Invention: chewing gum according to the above example (Table II)

Table IV. (Salivary extraction).

An analytical study of the saliva produced by seven volunteers after 20 minutes of chewing the gum prepared by the formula of the above-described example gave the following results:

| | |
|---|----------------|
| Soybean oil, lecithin, glycerol monostearate, waxes | not detectable |
| Elastomers | traces |
| Resins, polyvinyl acetate | not detectable |
| Talc | 1.5% |
| Aroma | 0.2% |
| BHA | several ppm |
| Sweetener (saccharin) | 0.15% |

analyzed by gas chromatography. The oils, waxes and insolubles were quantitatively analyzed by liquid chromatography.

In order to obtain a chewing gum having the composition according to the

Table V. (Saliva pH).

Samples prepared according to the above example after 10 minutes of chewing brought about a pH increase of 1.5 units in the oral cavity (study using 10 volunteers).

| | Initial | After 10 minutes | After 20 minutes |
|---------------------|---------|------------------|------------------|
| Sugar-containing CG | 7 | 7.5 | 7.5 |
| Sugarless CG | 7 | 7.5 | 7.5 |
| Invention | 7 | 8 | 8.5 |

invention without the risk of thermal degradation producing a bad flavor and an increase in the amount of extractable material, a low temperature must be used in the process.

The chewing gum having the composition of the example (Table II), for which the test results are shown in Tables III, IV and V, was obtained by the process described with reference to the figure and with the apparatus illustrated in the figure.

As a variant, one can prepare a chewing gum having a composition according to the invention by the following process.

One starts with a pre-existent gum base obtained according to a prior art process based on polymer technology.

The gum base is raised to a temperature ranging from 50°C to 70°C either in a microwave oven or in a kiln to render it mixable in an insulated X-blade mill preheated to 50-70°C.

The system is mixed, with lecithin, water at ambient temperature and talc added successively. The temperature at the end of mixing must be in the range

of about 50-60°C.

At this stage, sweeteners, aromatic substances and possibly special substances such as vitamins, minerals, enzymes, drugs, etc, may be added provided suitable precautions are taken with regard to their stability and efficacy.

In order to ensure the greatest possible degree of harmlessness of the packaged chewing gum obtained by the process illustrated with reference to the figure or by the above-cited variant, the chewing gum is coated, particularly when it is in the form of dragees, not with sugar or syrup (as is done conventionally) but with noncariogenic, nonassimilable substances such as gum arabic, calcium carbonate and/or titanium dioxide.

In particular, one may produce dragees by cutting the chewing gum obtained within the scope of the invention into 1-3 g pieces, which are then covered with a layer of calcium carbonate or titanium dioxide, coated with gum arabic, then glazed with gum arabic and talc or with polyvinyl acetate dissolved hot in alcohol. The weight increase of the pieces is on the order of 3-30% nonassimilable substances.

With the invention, it is thus possible to obtain a chewing paste of the chewing gum type that consists almost exclusively of insoluble substances (plasticized gum base), the proportion of soluble substances extractable by the saliva during chewing being quite minimal, and these extractable substances being neutral and harmless to the teeth and without caloric value.

Obviously, and as already stated in the preceding, the invention is by no means limited to those of its modes of application and embodiment that have been specifically contemplated; on the contrary, it embraces all variants:

Claims

1. Process for continuously producing, with metering of the components, a nonadhesive composite gum base specifically for a chewing paste of the chewing gum type, characterized by the following successive operations:

(i) At least one elastomer (a) and at least one mineral filler (b) are fed into a mixing apparatus (A) of the industrial mill type including heating means; the mixing apparatus is heated to raise its contents to a temperature ranging from about 80°C to about 100°C, and the contents of the mixing apparatus, maintained at said temperature, are mixed for a time period ranging from about 35 minutes to about 75 minutes;

(ii) The contents of the mixing apparatus are subsequently discharged and then consist of a nonadhesive premix (c);

(iii) Said premix is divided into fragments;

(iv) Metered amounts of fragments (d) of said premix and at least one other starting material (e) of the gum base are introduced into a powder mixer (B), and the contents of the mixer are mixed for several minutes;

(v) The mixture (f) thus obtained is discharged from the mixer.

2 Process for producing a chewing paste of the chewing gum type, characterized by the following successive operations:

(i) At least one elastomer (a) and at least one mineral filler (b) are fed into a mixing apparatus (A) of the industrial mill type including heating means; the mixing apparatus is heated to raise its contents to a temperature ranging from about 80°C to about 100°C,

and the contents of the mixing apparatus, maintained at said temperature, are mixed for a time period ranging from about 35 minutes to about 75 minutes;

(ii) The contents are subsequently discharged from the mixing apparatus and then consists of a nonadhesive premix (c);

(iii) Said premix is divided into fragments;

(iv) Metered amounts of the following are successively fed into an extruder (C) having several segments and means of maintaining each segment at a desired temperature:

- fragments (d) of said premix and at least one other starting material of the gum base,

- at least one plasticizer (g,h) and

- at least one flavoring substance (j,k), notably with a sweet taste,

the passage of the fragments of the premix and of the other starting material(s) of the gum base in the extruder being accomplished within several minutes (notably 1-5 minutes); and

(v) the product obtained is discharged from the extruder, cooled and shaped.

3. Process according to Claim 2, characterized by the fact that the mixing of the fragments of said premix (d) and at least one other starting material (e) of the gum base is conducted in a powder mixer (B) for several minutes prior to the feeding into the extruder (C), the mixture obtained (f) in said mixer being introduced into the first segment (C₁) of the extruder (C), while the plasticizer(s) (g,h) are introduced into the second segment,

and the flavoring substances (j,k) are introduced into the third segment (C₃) of the extruder.

4. Process according to Claim 3, characterized by the fact that, in extruder (C) with three successive segments, the first segment (C₁) is maintained at temperature on the order of 60-75°C and receives the unplasticized gum base (f) from the powder mixer; the second segment (C₂) is maintained at a temperature on the order of 50°C and receives the output from segment (C₁) and at least one liquid plasticizer (g) and at least one solid plasticizer (h), and the third segment (C₃) is maintained at a temperature on the order of 50°C-60°C and receives the output from segment (C₂), and the substances (j,k) that are most sensitive to temperature elevations, such as sweeteners and aromas.

5. Chewing paste of the chewing gum type, characterized by the fact that it comprises a gum base obtained by the process according to any of Claims 1 through 4.

6. Chewing paste according to Claim 5, characterized by the fact that it comprises no less than 97% gum base with at least one plasticizer, at least one filler and water plus no more than 3% sweetener product and flavoring substances.

7. Chewing paste according to Claim 6, characterized by the fact that the gum base comprises about 3-30 percent water and about 2-5 percent lecithin and/or glycerin as an emulsifier.

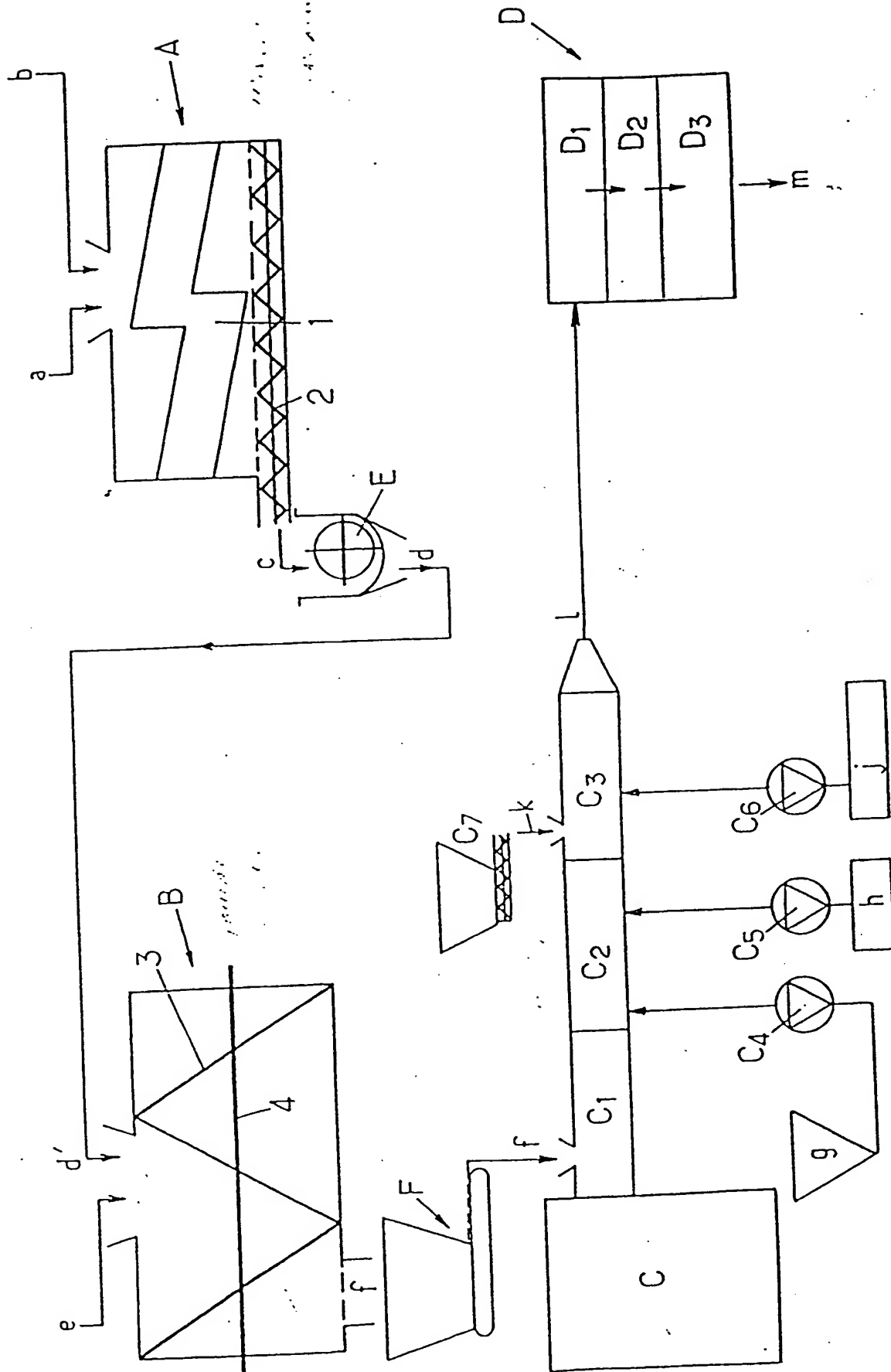
8. Chewing paste according to Claim 6 or 7, characterized by the fact that nonsugar products such as saccharin and aspartame are used as flavoring substances.

9. Chewing paste according to any of Claims 5 through 8, characterized by the fact that it comprises, as a gum base, a product having the following composition:

| | |
|---|--------------------------------|
| | about |
| Natural and/or synthetic elastomers | 3-11% |
| Microcrystalline waxes and/or hydrogenated oils | 5-20% |
| Glycerol monostearate | 0.5-15% |
| Semisynthetic resins and/or polyvinyl acetate | 10-30% |
| Fillers (talc and/or calcium carbonate) | 20-50% |
| Lecithin and/or glycerin | 2-5% |
| Antioxidant | 0.05-0.1% (on the order of) |
| Sodium benzoate | 0.1% (on the order of) |
| Water | 5-30% |

10. Dragee obtained from the chewing paste according to Claim 9 and characterized by the fact that it comprises a coating of 3-30 percent nonassimilable, noncariogenic substances consisting of talc or calcium carbonate, gum arabic and polyvinyl acetate.

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APPENDIX E

U.S. Patent No. 4,379,169 (“Reggio”)